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CUTLER, ALBERT H	

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2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/760,967	IWASAWA ET AL.
	Examiner	**Art Unit**
	ALBERT H. CUTLER	2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _04 February 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-4,6-12,14-20 and 22-24_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-4,6-12,14-20 and 22-24_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This office action is responsive to communication filed on February 4, 2008. Claims 1-4, 6-12, 14-20 and 22-24 are pending in the application and have been examined by the Examiner.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 17, 2007 has been entered.

Response to Arguments

3. Applicant's arguments with respect to claims 1, 9 and 17 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

4. Claim 22 is objected to because of the following informalities: Lack of clarity and precision. Claim 22 recites, "The MOB solid-state imaging element". Upon further examination, it appears that claim 22 should read, "The MOS solid-state imaging element". Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-4, 6, 7, 9-12, 14, 15, 17-20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada et al. (US 6,124,888) in view of Yamada (US 7,365,779) and Sasaki (US 5,414,464).

Consider claim 1, Terada et al. teaches:

A MOS solid-state imaging element (figure 8), comprising:

a range specifying portion (vertical memory, 209 and horizontal memory, 206) for selecting pixels to be read out according to a range and a resolution of the range (See column 12, line 64 through column 13, line 2. The vertical and horizontal memories determine the position information of charge transfer pulses. The charge transfer pulses can be used to initiate a block scanning method in which the starting and ending

scanning positions (i.e. range) are determined by the horizontal and vertical memories (206 and 209), column 13, line 61 through column 14, line 13. The vertical and horizontal memories (209 and 206) can also be used to specify the entire range of the image sensor to be read out at a lower resolution. This is the skip scanning method, and is detailed in column 14, lines 33-51. Of course, a whole pixel scanning method can also be implemented in which the entire range of the image sensor is indicated and read out at a high resolution without skipping pixels. This is detailed in column 13, lines 6-59. Figure 10, column 14, line 54 through column 15, line 13 details selecting between the three modes having different ranges and resolutions.); and

a selection portion (vertical scanning circuit, 208 and horizontal scanning circuit, 203) for sending the selection signals only to pixels that have been selected from among all of the pixels (See column 13 line 61 through column 15, line 13 for the sending of selection signals via the vertical and horizontal scanning circuits according to the whole pixel, skip, and block scanning methods.), with some of the pixels being thinned out, in the range specified by the range specifying portion by outputting the selection signals in correspondence with a specification from the range specifying portion (During skip scanning, the range is specified as the entire range, and the scanning circuits (208 and 203) are driven to provide selection pulses to every other column or line (i.e. some of he pixels are thinned out), column 14, lines 33-51.);

wherein the pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in that pixel (See column 13, lines 31-40 for the output of pixel signals via the scanning circuits.).

However, Terada et al. does not explicitly teach that the range specifying portion is for determining a density of a signal spacing between selection signals in which a resolution is to be different in an image. Basically, Terada et al. does not explicitly teach of reading out a single image with multiple resolutions. Terada et al. teaches that a range is determined as the entire range of the image sensor or a smaller block of the image sensor, and only that range is read out.

Yamada similarly teaches an imaging device (22, figure 3), and of block scanning method in which only a certain range of the image sensor is read out (See figure 4, column 4, lines 59-67).

However, in addition to the teachings of Terada et al., Yamada teaches that the range specifying portion is for determining a density of a signal spacing between selection signals in which a resolution is to be different in an image (Yamada teaches this in figures 15-18, column 9, line 6 through column 10, line 52. Basically, Yamada teaches that the surface of the image sensor (22) can be broken into two ranges (1 and 2), and that all of the pixels from one of the ranges are selected, but only some of the pixels from the other range are selected. For instance in figure 16, column 9, lines 32-58, Yamada teaches that all of the pixels are taken from the surrounding range (1), and only every third pixel is taken from the center range (2). Therefore, the density of signal spacing in the center range is different from the density of signal spacing of the exterior range.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to use the range specifying portion taught by Terada et al. to

specify different densities of signal spacing between selection signals in different ranges as taught by Yamada for the benefit of reducing the memory capacity required for storing read out pixels (Yamada, column 2, lines 14-18).

However, the combination of Terada et al. and Yamada does not explicitly teach that the solid-state imaging element has a photodiode and an amplifier for each pixel, or that the amplifier of a pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in the photodiode of that pixel.

Like Terada et al., Sasaki teaches of a CMD image sensor (20, figure 3).

However, in addition to the teachings of Terada et al. and Yamada, Sasaki teaches that the CMD image sensor has a photodiode (20a) and an amplifier (20b) for each pixel (figure 3, column 3, line 59 through column 4, line 7), and that the amplifier (20b) of a pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in the photodiode of that pixel (The photodiode outputs a signal through the amplifier when addressed by x and y address connection switches (20d and 20e), column 3, line 66 through column 4, line 7.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the pixels of the imaging element taught by the combination of Terada et al. and Yamada comprise photodiodes connected to amplifiers as taught by Sasaki for the benefit of providing an imaging element which is simple in construction, yet permits a non-destructive readout (Sasaki, column 1, line 65 through column 2, line 5).

Consider claim 2, and as applied to claim 1 above, Terada et al. further teaches:

a memory portion (vertical memory, 209 and horizontal memory, 206) storing in advance a range of the image to be read out (Column 12, line 64 through column 13, line 2 details the controlling of the position of selection signals via memories 206 and 209.).

Terada et al. does not explicitly teach that different ranges have different resolutions.

Yamada teaches determining a range in which a resolution is to be different in the image and a resolution of that range (See figure 18, column 10, lines 30-52. Yamada teaches of movable ranges (1 and 2) having different resolutions.).

Consider claim 3, and as applied to claim 1 above, Terada et al. further teaches:

wherein the range of the image specified by the range specifying portion, is dynamically changed from the outside (See column 12, line 64 through column 13, line 2. Terada et al. teaches that the range provided by the memories (206 and 209) is loaded by a control pulse from an "outside source".).

Terada et al. does not explicitly teach that different ranges have different resolutions.

Yamada teaches determining a range in which a resolution is to be different in the image and a resolution of that range (See figure 18, column 10, lines 30-52. Yamada teaches of movable ranges (1 and 2) having different resolutions.).

Consider claim 4, and as applied to claim 1 above, Terada et al. further teaches a color filter for each pixel (Terada et al. teaches of using color filters in figures 27A and 27B, column 26, lines 41-62.).

Consider claim 6, and as applied to claim 1 above, Terada et al. further teaches:

when outputting image signals to the outside, information expressing a range in which a resolution is to be different in the image and a resolution of the range are added to the image signals before they are output (See column 12, lines 30-32. A memory (110) is used to preserve the information showing the kind of driving mode at the end of image pickup. Terada et al. teach in column 12, lines 20-29 that the system controller generates a timing pulse according to the driving mode (i.e. skip, whole pixel, or block scanning), and sends this timing pulse image pickup device (103). At this time, a driver (109) sends a synchronous signal containing processing timings to the signal processor (104), recorder (105), and display signal processor (106) such that the image data can be processed and displayed according to the same processing timing as the image is picked up.).

Consider claim 7, and as applied to claim 1 above, Terada et al. further teaches an imaging device comprising the MOS solid-state imaging element according to claim 1 (The image pickup device (103) is in an image pickup apparatus (figure 7).).

Consider claim 9, Terada et al. teaches:

A MOS solid-state imaging element (figure 8), comprising:

a plurality of the pixels (201) arranged in a matrix (see figure 8);

horizontal read portions (horizontal selection lines, 202) provided for respective columns of the pixels (201, see figure 8), each horizontal read portion (202) being connected to pixels (201) in each column so as to be capable of reading out pixel signals from the pixels in the respective columns (See column 13, lines 31-40 for the output of a pixel signal through the horizontal read portions.);

a horizontal selection switching circuit (horizontal scanning circuit, 203) for switching and outputting the pixel signals read from the pixels by the horizontal read portion for each column (See column 13 line 61 through column 15, line 13 for the sending of selection signals via the horizontal scanning circuit (203) according to the whole pixel, skip, and block scanning methods. The selection signals enable the output of pixels via the horizontal read portion (202), column 13, lines 31-40.);

a horizontal selection circuit (The horizontal scanning circuit, 203, comprises the horizontal selection switching circuit and horizontal selection circuit as its switching enables horizontal selection.) connected to the horizontal read portion (202) and outputting horizontal selection signals for selecting, for each column, the pixel signals of pixels to be read out (See column 13 line 61 through column 15, line 13 for the sending of selection signals via the horizontal scanning circuit (203) according to the whole pixel, skip, and block scanning methods. The selection signals enable the output of pixels via the horizontal read portion (202), column 13, lines 31-40.);

a horizontal range specifying circuit (horizontal memory, 206) connected to the horizontal selection circuit (203) and determining density of a signal spacing of the horizontal selection signals (See column 12, line 64 through column 13, line 2. The vertical and horizontal memories determine the position information of charge transfer pulses. The charge transfer pulses can be used to initiate a block scanning method in which the starting and ending scanning positions (i.e. range) are determined by the horizontal and vertical memories (206 and 209), column 13, line 61 through column 14, line 13. The vertical and horizontal memories (209 and 206) can also be used to specify the entire range of the image sensor to be read out at a lower resolution. This is the skip scanning method, and is detailed in column 14, lines 33-51. Of course, a whole pixel scanning method can also be implemented in which the entire range of the image sensor is indicated and read out at a high resolution without skipping pixels. This is detailed in column 13, lines 6-59. Figure 10, column 14, line 54 through column 15, line 13 details selecting between the three modes having different ranges and resolutions. During skip scanning, the range is specified as the entire range, and the scanning circuits (208 and 203) are driven to provide selection pulses to every other column or line (i.e. the density of signal spacing is reduced), column 14, lines 33-51.);

a vertical selection circuit (vertical scanning circuit, 208) connected to each row of the pixels (201) and outputting vertical selection signals for selecting the pixel signals of pixels to be read out for each row (See column 13 line 61 through column 15, line 13 for the sending of selection signals via the vertical scanning circuit (208) according to

the whole pixel, skip, and block scanning methods. Selecting a row via the vertical selection circuit (208) is detailed in column 13, lines 14-25);

a vertical range specifying circuit (vertical memory, 209) connected to the vertical selection circuit (208) and determining a density of a signal spacing of the vertical selection signals (See column 12, line 64 through column 13, line 2. The vertical and horizontal memories determine the position information of charge transfer pulses. The charge transfer pulses can be used to initiate a block scanning method in which the starting and ending scanning positions (i.e. range) are determined by the horizontal and vertical memories (206 and 209), column 13, line 61 through column 14, line 13. The vertical and horizontal memories (209 and 206) can also be used to specify the entire range of the image sensor to be read out at a lower resolution. This is the skip scanning method, and is detailed in column 14, lines 33-51. Of course, a whole pixel scanning method can also be implemented in which the entire range of the image sensor is indicated and read out at a high resolution without skipping pixels. This is detailed in column 13, lines 6-59. Figure 10, column 14, line 54 through column 15, line 13 details selecting between the three modes having different ranges and resolutions. During skip scanning, the range is specified as the entire range, and the scanning circuits (208 and 203) are driven to provide selection pulses to every other column or line (i.e. the density of signal spacing is reduced), column 14, lines 33-51.); and

a pixel output connected to the horizontal read portion (202) and outputting the pixel signals wherein the pixels are thinned out in the specified range based on the density of a signal spacing of the horizontal selection signals and the vertical selection

signals (As detailed above, either the entire range or a range consisting of a smaller block of the image sensor is specified. In the skip scanning method, the entire range is specified and the scanning circuits (208 and 203) are driven to provide selection pulses to every other column or line (i.e. the density of signal spacing is reduced and the pixels are thinned out), column 14, lines 33-51.

However, Terada et al. does not explicitly teach that "some" or the pixels are thinned out. Rather, Terada teaches that a range is selected, and all of the pixels of that range are read out, or the entire range thinned.

Yamada similarly teaches an imaging device (22, figure 3), and of block scanning method in which only a certain range of the image sensor is read out (See figure 4, column 4, lines 59-67).

However, in addition to the teachings of Terada et al., Yamada teaches that the range specifying portion is for determining a density of a signal spacing between selection signals in which a resolution is to be different in an image (Yamada teaches this in figures 15-18, column 9, line 6 through column 10, line 52. Basically, Yamada teaches that the surface of the image sensor (22) can be broken into two ranges (1 and 2), and that all of the pixels from one of the ranges are selected, but only some of the pixels from the other range are selected. For instance in figure 16, column 9, lines 32-58, Yamada teaches that all of the pixels are taken from the surrounding range (1), and only every third pixel is taken from the center range (2). Therefore, the density of signal spacing in the center range is different from the density of signal spacing of the exterior range.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to use the range specifying portion taught by Terada et al. to specify different densities of signal spacing between selection signals in different ranges as taught by Yamada for the benefit of reducing the memory capacity required for storing read out pixels (Yamada, column 2, lines 14-18).

However, the combination of Terada et al. and Yamada does not explicitly teach that the solid-state imaging element has a photodiode and an amplifier for each pixel, or that the amplifier of a pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in the photodiode of that pixel.

Like Terada et al., Sasaki teaches of a CMD image sensor (20, figure 3).

However, in addition to the teachings of Terada et al. and Yamada, Sasaki teaches that the CMD image sensor has a photodiode (20a) and an amplifier (20b) for each pixel (figure 3, column 3, line 59 through column 4, line 7), and that the amplifier (20b) of a pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in the photodiode of that pixel (The photodiode outputs a signal through the amplifier when addressed by x and y address connection switches (20d and 20e), column 3, line 66 through column 4, line 7.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the pixels of the imaging element taught by the combination of Terada et al. and Yamada comprise photodiodes connected to amplifiers as taught by Sasaki for the benefit of providing an imaging element which is simple in

construction, yet permits a non-destructive readout (Sasaki, column 1, line 65 through column 2, line 5).

Consider claim 10, and as applied to claim 9 above, Terada et al. further teaches:

a memory portion (vertical memory, 209 and horizontal memory, 206) for storing in advance information for detecting a region in the matrix of the pixels to be altered (Column 12, line 64 through column 13, line 2 details the controlling of the position of selection signals via memories 206 and 209.)

Terada et al. does not explicitly teach that different ranges have different densities of a signal spacing between the horizontal or vertical selection signals and degrees of the alteration.

Yamada teaches determining a range in which a density is to be different in the image and a degree of alteration of that range (See figure 18, column 10, lines 30-52. Yamada teaches of movable ranges (1 and 2) having different densities and degrees of alteration.).

Consider claim 11, and as applied to claim 9 above, Terada et al. further teaches:

the horizontal range specifying circuit and the vertical range specifying circuit are capable of being changed from the outside dynamically of information for determining a region in the matrix of the pixels to be read out (See column 12, line 64 through column

13, line 2. Terada et al. teaches that the range provided by the memories (206 and 209) is loaded by a control pulse from an "outside source".).

Terada et al. does not explicitly teach that different ranges have different densities of a signal spacing between the horizontal or vertical selection signals and degrees of the alteration.

Yamada teaches determining a range in which a density is to be different in the image and a degree of alteration of that range (See figure 18, column 10, lines 30-52. Yamada teaches of movable ranges (1 and 2) having different densities and degrees of alteration.).

Consider claim 12, and as applied to claim 9 above, Terada et al. further teaches a color filter for each pixel (Terada et al. teaches of using color filters in figures 27A and 27B, column 26, lines 41-62.).

Consider claim 14, and as applied to claim 9 above, Terada et al. further teaches:

when outputting image signals generated based on the pixel signals read out from the pixels in the matrix to the outside, the image signals to be output are added with information for indicating a region where the pixel signals have been read out with the horizontal or vertical selection signals having altered density of a signal spacing there between and for indicating a resolution in the region (See column 12, lines 30-32. A memory (110) is used to preserve the information showing the kind of driving mode at

the end of image pickup. Terada et al. teach in column 12, lines 20-29 that the system controller generates a timing pulse according to the driving mode (i.e. skip, whole pixel, or block scanning), and sends this timing pulse image pickup device (103). At this time, a driver (109) sends a synchronous signal containing processing timings to the signal processor (104), recorder (105), and display signal processor (106) such that the image data can be processed and displayed according to the same processing timing as the image is picked up.).

Consider claim 15, and as applied to claim 9 above, Terada et al. further teaches an imaging device comprising the MOS solid-state imaging element according to claim 9 (The image pickup device (103) is in an image pickup apparatus (figure 7).).

Consider claim 17, Terada et al. teaches:

A MOS solid-state imaging element (figure 8), comprising:

a plurality of the pixels (201) arranged in a matrix (see figure 8);

horizontal read portions (horizontal selection lines, 202) provided for respective columns of the pixels (201, see figure 8), each horizontal read portion (202) being connected to pixels (201) in each column so as to be capable of reading out pixel signals from the pixels in the respective columns (See column 13, lines 31-40 for the output of a pixel signal through the horizontal read portions.);

a horizontal selection circuit (horizontal scanning circuit, 203) connected to the horizontal read portion (202) and outputting horizontal selection signals for selecting, for

each column, the pixel signals of pixels to be read out (See column 13 line 61 through column 15, line 13 for the sending of selection signals via the horizontal scanning circuit (203) according to the whole pixel, skip, and block scanning methods. The selection signals enable the output of pixels via the horizontal read portion (202), column 13, lines 31-40.);

a vertical selection circuit (vertical scanning circuit, 208) connected to each row of the pixels (201) and outputting vertical selection signals for selecting the pixel signals of pixels to be read out for each row (See column 13 line 61 through column 15, line 13 for the sending of selection signals via the vertical scanning circuit (208) according to the whole pixel, skip, and block scanning methods. Selecting a row via the vertical selection circuit (208) is detailed in column 13, lines 14-25);

wherein the horizontal selection signals and the vertical selection signals have an altered density of a signal spacing therebetween, respectively, and the pixels are thinned out in the specified range based on the density of a signal spacing of the horizontal selection signals and the vertical selection signals (See column 12, line 64 through column 13, line 2. The vertical and horizontal memories determine the position information of charge transfer pulses. The charge transfer pulses can be used to initiate a block scanning method in which the starting and ending scanning positions (i.e. range) are determined by the horizontal and vertical memories (206 and 209), column 13, line 61 through column 14, line 13. The vertical and horizontal memories (209 and 206) can also be used to specify the entire range of the image sensor to be read out at a lower resolution. This is the skip scanning method, and is detailed in column 14, lines

33-51. Of course, a whole pixel scanning method can also be implemented in which the entire range of the image sensor is indicated and read out at a high resolution without skipping pixels. This is detailed in column 13, lines 6-59. Figure 10, column 14, line 54 through column 15, line 13 details selecting between the three modes having different ranges and resolutions. During skip scanning, the range is specified as the entire range, and the scanning circuits (208 and 203) are driven to provide selection pulses to every other column or line (i.e. the density of signal spacing is reduced and the pixels are thinned), column 14, lines 33-51.).

However, Terada et al. does not explicitly teach that “some” or the pixels are thinned out. Rather, Terada teaches that a range is selected, and all of the pixels of that range are read out, or the entire range thinned.

Yamada similarly teaches an imaging device (22, figure 3), and of block scanning method in which only a certain range of the image sensor is read out (See figure 4, column 4, lines 59-67).

However, in addition to the teachings of Terada et al., Yamada teaches that the range specifying portion is for determining a density of a signal spacing between selection signals in which a resolution is to be different in an image (Yamada teaches this in figures 15-18, column 9, line 6 through column 10, line 52. Basically, Yamada teaches that the surface of the image sensor (22) can be broken into two ranges (1 and 2), and that all of the pixels from one of the ranges are selected, but only some of the pixels from the other range are selected. For instance in figure 16, column 9, lines 32-58, Yamada teaches that all of the pixels are taken from the surrounding range (1), and

only every third pixel is taken from the center range (2). Therefore, the density of signal spacing in the center range is different from the density of signal spacing of the exterior range.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to use the range specifying portion taught by Terada et al. to specify different densities of signal spacing between selection signals in different ranges as taught by Yamada for the benefit of reducing the memory capacity required for storing read out pixels (Yamada, column 2, lines 14-18).

However, the combination of Terada et al. and Yamada does not explicitly teach that the solid-state imaging element has a photodiode and an amplifier for each pixel, or that the amplifier of a pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in the photodiode of that pixel.

Like Terada et al., Sasaki teaches of a CMD image sensor (20, figure 3).

However, in addition to the teachings of Terada et al. and Yamada, Sasaki teaches that the CMD image sensor has a photodiode (20a) and an amplifier (20b) for each pixel (figure 3, column 3, line 59 through column 4, line 7), and that the amplifier (20b) of a pixel to which a selection signal has been input outputs, as a pixel signal, a charge that has accumulated in the photodiode of that pixel (The photodiode outputs a signal through the amplifier when addressed by x and y address connection switches (20d and 20e), column 3, line 66 through column 4, line 7.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the pixels of the imaging element taught by the

combination of Terada et al. and Yamada comprise photodiodes connected to amplifiers as taught by Sasaki for the benefit of providing an imaging element which is simple in construction, yet permits a non-destructive readout (Sasaki, column 1, line 65 through column 2, line 5).

Consider claim 18, and as applied to claim 17 above, Terada et al. further teaches:

a memory portion (vertical memory, 209 and horizontal memory, 206) for storing in advance information for detecting a region in the matrix of the pixels to be altered (Column 12, line 64 through column 13, line 2 details the controlling of the position of selection signals via memories 206 and 209.)

Terada et al. does not explicitly teach that different ranges have different densities of a signal spacing between the horizontal or vertical selection signals and degrees of the alteration.

Yamada teaches determining a range in which a density is to be different in the image and a degree of alteration of that range (See figure 18, column 10, lines 30-52. Yamada teaches of movable ranges (1 and 2) having different densities and degrees of alteration.).

Consider claim 19, and as applied to claim 17 above, Terada et al. further teaches:

the horizontal range specifying circuit and the vertical range specifying circuit are capable of being changed from the outside dynamically of information for determining a region in the matrix of the pixels to be read out (See column 12, line 64 through column 13, line 2. Terada et al. teaches that the range provided by the memories (206 and 209) is loaded by a control pulse from an "outside source".).

Terada et al. does not explicitly teach that different ranges have different densities of a signal spacing between the horizontal or vertical selection signals and degrees of the alteration.

Yamada teaches determining a range in which a density is to be different in the image and a degree of alteration of that range (See figure 18, column 10, lines 30-52. Yamada teaches of movable ranges (1 and 2) having different densities and degrees of alteration.).

Consider claim 20, and as applied to claim 17 above, Terada et al. further teaches a color filter for each pixel (Terada et al. teaches of using color filters in figures 27A and 27B, column 26, lines 41-62.).

Consider claim 22, and as applied to claim 17 above, Terada et al. further teaches:

when outputting image signals generated based on the pixel signals read out from the pixels in the matrix to the outside, the image signals to be output are added with information for indicating a region where the pixel signals have been read out with

the horizontal or vertical selection signals having altered density of a signal spacing there between and for indicating a resolution in the region (See column 12, lines 30-32. A memory (110) is used to preserve the information showing the kind of driving mode at the end of image pickup. Terada et al. teach in column 12, lines 20-29 that the system controller generates a timing pulse according to the driving mode (i.e. skip, whole pixel, or block scanning), and sends this timing pulse image pickup device (103). At this time, a driver (109) sends a synchronous signal containing processing timings to the signal processor (104), recorder (105), and display signal processor (106) such that the image data can be processed and displayed according to the same processing timing as the image is picked up.).

Consider claim 23, and as applied to claim 17 above, Terada et al. further teaches an imaging device comprising the MOS solid-state imaging element according to claim 9 (The image pickup device (103) is in an image pickup apparatus (figure 7).).

8. Claims 8, 16, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada et al. (US 6,124,888) in view of Yamada (US 7,365,779) and Sasaki (US 5,414,464) as applied to claims 6, 14 and 22 above, and further in view of Kondo et al. (U.S. Patent 6,678,405).

Consider claim 8, and as applied to claim 6 above, the combination of Terada et al., Yamada, and Sasaki does not explicitly teach of boundary filter between regions having different resolutions.

Kondo et al. is similar to Terada et al. in that Kondo et al. is concerned with improving processing efficiency (column 1, lines 10-15). Kondo et al. is also similarly is concerned with image readout including pixel manipulation (column 7, lines 9-40).

However, in addition to the teachings the combination of Terada et al., Yamada, and Sasaki, Kondo et al. teach of a filter (figure 1) that executes filter processing (The filter of Kondo et al. filters pixels in order to obtain optimal blurring, column 7, line 23 through column 8, line 37.), and that the filter portion (figure 1) changes a tap coefficient ("prediction coefficient", column 8, lines 4-10, figure 4) in conjunction with the spacing of the density (The tap information (i.e. tap coefficient) controls the interval between pixels (i.e. spacing of the density) constituting the tap to differ depending on the statistical value of the input image (i.e. based on input image data), column 8, lines 34-37.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to contain a filter which executes filter processing by changing a tap coefficient in conjunction with the spacing of the density in accordance with input image data as taught by Kondo et al. in the imaging device and utilized in the boundary between different regions having different resolutions taught by the combination of Terada et al., Yamada, and Sasaki for the benefit of creating a higher quality image with improved features, low noise, and free from blurring(column 1, lines 17-35).

Consider claim 16, and as applied to claim 14 above, the combination of Terada et al., Yamada, and Sasaki does not explicitly teach of boundary filter between regions having different resolutions.

Kondo et al. is similar to Terada et al. in that Kondo et al. is concerned with improving processing efficiency (column 1, lines 10-15). Kondo et al. is also similarly is concerned with image readout including pixel manipulation (column 7, lines 9-40).

However, in addition to the teachings the combination of Terada et al., Yamada, and Sasaki, Kondo et al. teach of a filter (figure 1) that executes filter processing (The filter of Kondo et al. filters pixels in order to obtain optimal blurring, column 7, line 23 through column 8, line 37.), and that the filter portion (figure 1) changes a tap coefficient ("prediction coefficient", column 8, lines 4-10, figure 4) in conjunction with the spacing of the density (The tap information (i.e. tap coefficient) controls the interval between pixels (i.e. spacing of the density) constituting the tap to differ depending on the statistical value of the input image (i.e. based on input image data), column 8, lines 34-37.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to contain a filter which executes filter processing by changing a tap coefficient in conjunction with the spacing of the density in accordance with input image data as taught by Kondo et al. in the imaging device and utilized in the boundary between different regions having different resolutions taught by the combination of Terada et al., Yamada, and Sasaki for the benefit of creating a higher

quality image with improved features, low noise, and free from blurring(column 1, lines 17-35).

Consider claim 24, and as applied to claim 22 above, the combination of Terada et al., Yamada, and Sasaki does not explicitly teach of boundary filter between regions having different resolutions.

Kondo et al. is similar to Terada et al. in that Kondo et al. is concerned with improving processing efficiency (column 1, lines 10-15). Kondo et al. is also similarly is concerned with image readout including pixel manipulation (column 7, lines 9-40).

However, in addition to the teachings the combination of Terada et al., Yamada, and Sasaki, Kondo et al. teach of a filter (figure 1) that executes filter processing (The filter of Kondo et al. filters pixels in order to obtain optimal blurring, column 7, line 23 through column 8, line 37.), and that the filter portion (figure 1) changes a tap coefficient ("prediction coefficient", column 8, lines 4-10, figure 4) in conjunction with the spacing of the density (The tap information (i.e. tap coefficient) controls the interval between pixels (i.e. spacing of the density) constituting the tap to differ depending on the statistical value of the input image (i.e. based on input image data), column 8, lines 34-37.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to contain a filter which executes filter processing by changing a tap coefficient in conjunction with the spacing of the density in accordance with input image data as taught by Kondo et al. in the imaging device and utilized in the boundary between different regions having different resolutions taught by the

combination of Terada et al., Yamada, and Sasaki for the benefit of creating a higher quality image with improved features, low noise, and free from blurring(column 1, lines 17-35).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALBERT H. CUTLER whose telephone number is (571)270-1460. The examiner can normally be reached on Mon-Thu (9:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan V Ho can be reached on (571)-272-7365. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Tuan V Ho/
Primary Examiner, Art Unit 2622

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